

IN THE CLAIMS:

1-76. (Cancelled)

77 (currently amended). A ~~composition~~ method for polishing a substrate surface having at least one feature thereon comprising a noble metal, a noble metal alloy, a noble metal oxide, or any combination thereof, comprising:

providing to said substrate surface a composition comprising:

periodic acid and an abrasive in a combined amount sufficient to render the substrate surface substantially planar upon chemical-mechanical polishing thereof, wherein periodic acid is in an amount from about 0.05 to about 0.3 moles/kilogram; and ~~said composition having a pH selected from a group consisting of a pH from about pH 1 to less than pH 2 and a pH from above pH 5 to about pH 10~~

polishing a substrate surface having at least one feature thereon comprising a noble metal, a noble metal alloy, a noble metal oxide, or any combination thereof, wherein the polishing rate of said at least one feature is from about 300 Angstroms per minute to about 2000 Angstroms per minute.

78 (currently amended). The ~~composition~~ method of claim 77, wherein periodic acid is in an amount from about 0.075 to about 0.3 moles/kilogram.

79 (currently amended). The ~~composition~~ method of claim 77, wherein periodic acid is in an amount from about 0.075 to about 0.175 moles/kilogram.

80 (currently amended). The ~~composition~~ method of claim 77, wherein the abrasive is in an amount from about 0.2 to about 6 weight percent.

81 (currently amended). The ~~composition~~ method of claim 77, wherein the abrasive is in an amount from about 0.2 to about 4 weight percent.

82 (currently amended). The ~~composition~~ method of claim 77, further comprising a pH-adjusting agent, wherein the pH is from about pH 6 5 to about pH 10.

83 (currently amended). The ~~composition~~ method of claim 77, further comprising a pH-adjusting agent, wherein the pH is from about pH 1 to about pH 4.

84 (currently amended). The ~~composition~~ method of claim 83, wherein the composition consists essentially of water, periodic acid, an abrasive, and a pH-adjusting agent is selected from a group consisting of a quaternary amine, an inorganic base, and any combination thereof.

85 (currently amended). The ~~composition~~ method of claim 83, wherein the pH-adjusting agent comprises an agent selected from a group consisting of tetramethylammonium hydroxide, ammonium hydroxide, potassium hydroxide, sodium hydroxide, and any combination thereof.

86 (currently amended). The ~~composition~~ method of claim 77, further comprising a suspension agent.

87 (currently amended). The ~~composition~~ method of claim 86, wherein the suspension agent comprises an agent is selected from a group consisting of an organic acid, a surfactant, another abrasive, and ethyl carbonate.

88 (currently amended). The ~~composition~~ method of claim 77, wherein the abrasive comprises an abrasive having a Mohs hardness number of greater than about 6.5.

89 (currently amended). The ~~composition~~ method of claim 77, wherein the abrasive comprises an abrasive selected from a group consisting of alumina, silica, zirconia, spinel, zirconium nitride, carbide, and any combination thereof

90 (currently amended). The ~~composition~~ method of any of claims 77 through 86, wherein the abrasive comprises alumina.

91 (currently amended). The ~~composition~~ method of any of claims 77 through 86, wherein the feature comprises a material selected from a group consisting of Ir, IrO₂, Pt, and any combination thereof

92 (currently amended). The ~~composition~~ method of claim 77, wherein said combined amount is sufficient to provide the substrate surface with a WWNU of less than about 12%

93 (currently amended). The ~~composition~~ method of claim 77, wherein said combined amount is sufficient to provide the substrate surface with a WTWNU of less than about 5%.

94 (currently amended). A ~~composition~~ method for polishing a substrate surface having at least one feature thereon comprising a noble metal, a noble metal alloy, a noble metal oxide, or any combination thereof, comprising:

providing to said substrate surface a composition comprising:

periodic acid in an amount from about 0.05 to about 0.3 moles/kilogram,; and

an abrasive in an amount from about 0.2 to about 6 weight percent;

~~said composition having a pH selected from a group consisting of a pH from about pH~~

~~1 to less than pH 2 and a pH from above pH 5 to about pH 10~~

polishing a substrate surface having at least one feature thereon comprising a noble metal, a noble metal alloy, a noble metal oxide, or any combination thereof, wherein the substrate further comprises a dielectric material, and wherein the selectivity of the composition for polishing the noble metal-containing material over polishing the dielectric material is at least 1:1.

95 (currently amended). The ~~composition~~ method of claim 94, wherein the amount of periodic acid is from about 0.075 to about 0.3 moles/kilogram.

96 (currently amended). The ~~composition~~ method of claim 94, wherein the amount of periodic acid is from about 0.075 to about 0.175 moles/kilogram

97 (currently amended). The ~~composition~~ method of claim 94, wherein the amount of the abrasive is from about 0.2 to about 4 weight percent.

98 (currently amended). The ~~composition~~ method of claim 94, wherein the pH is from about pH 6 to about pH 10.

99 (currently amended). The ~~composition~~ method of claim 94, further comprising a pH-adjusting agent.

100 (currently amended). The ~~composition~~ method of claim 99, wherein the pH-adjusting is selected from a group consisting of a quaternary amine, an inorganic base, and any combination thereof.

101 (currently amended). The ~~composition~~ method of claim 99, wherein the pH-adjusting agent comprises an agent selected from a group consisting of tetramethylammonium hydroxide, ammonium hydroxide, potassium hydroxide, sodium hydroxide, and any combination thereof.

102 (currently amended). The ~~composition~~ method of claim 94, further comprising a suspension agent.

103 (currently amended). The ~~composition~~ method of claim 102, wherein the suspension agent comprises an agent selected from a group consisting of an organic acid, a surfactant, another abrasive, and ethyl carbonate.

104 (currently amended). The ~~composition~~ method of claim 94, wherein the abrasive comprises an abrasive having a Mohs hardness number of greater than about 6.5.

105 (currently amended). The ~~composition~~ method of claim 94, wherein the abrasive comprises an abrasive selected from a group consisting of alumina, silica, zirconia, spinel, zirconium nitride, carbide, and any combination thereof.

106 (currently amended). The ~~composition~~ method of any of claims 94 through 102, wherein the abrasive comprises alumina.

107 (currently amended). The ~~composition~~ method of claim 94, wherein said composition provides the substrate surface with a WWNU of less than about 12% upon chemical-mechanical polishing thereof.

108 (currently amended). The ~~composition~~ method of claim 94, wherein said composition provides the substrate surface with a WTWNU of less than about 5% upon chemical-mechanical polishing thereof

109 (currently amended). The ~~composition~~ method of claim ~~any one of claims 94 ; 107, and 108,~~ wherein the feature comprises ~~a material selected from a group consisting of Ir , IrO₂, Pt, and any combination thereof.~~

110 (New). The method of claim 94, wherein the feature comprises IrO₂.

111 (New). The method of claim 94, wherein the feature comprises platinum.

112 (New). A method for polishing a substrate surface having at least one feature thereon comprising a noble metal, a noble metal alloy, a noble metal oxide, or any combination thereof, comprising:

A) providing to said substrate surface a composition consisting essentially of:

- 1) water;
- 2) periodic acid in an amount from about 0.05 to about 0.3 moles/kilogram;
- 3) a first alumina abrasive in an amount from about 0.2 to about 6 weight percent;
- 4) optionally, a pH-adjusting agent in an amount sufficient to cause the pH of the slurry to be between about 1 to about 4 or between about 5 to about 10;
- 5) optionally, a suspension agent; and
- 6) optionally, an electrolyte, and

B) polishing a substrate surface having at least one feature thereon comprising a noble metal, a noble metal alloy, a noble metal oxide, or any combination thereof.

113 (New). The method of claim 112 wherein the pH-adjusting agent is selected from a group consisting of a quaternary amine, an inorganic base, and any combination thereof.

114(New). The method of claim 112, wherein the composition consists essentially of:

- 1) water;
- 2) periodic acid in an amount from about 0.05 to about 0.3 moles/kilogram;
- 3) an alumina abrasive in an amount from about 0.2 to about 6 weight percent; and
- 4) a pH-adjusting agent in an amount sufficient to cause the pH of the slurry to be between about 1 to about 4 or between about 5 to about 10.

115 (New). The method of claim 114, wherein the pH of the slurry is between about 1 to about 4.

116 (New). The method of claim 114, wherein the pH of the slurry is between about 5 to about 10.

117 (New). The method of claim 112, wherein the suspension agent is selected from a group consisting of an organic acid, a surfactant, another abrasive, and ethyl carbonate.

118(New). The method of claim 112, wherein the composition consists essentially of:

- 1) water;
- 2) periodic acid in an amount from about 0.05 to about 0.3 moles/kilogram;
- 3) an alumina abrasive in an amount from about 0.2 to about 6 weight percent; and
- 4) optionally a pH-adjusting agent in an amount sufficient to cause the pH of the slurry to be between about 1 to about 4 or between about 5 to about 10; and
- 5) a suspension agent; and
- 6) optionally, an electrolyte.

- 119 (New). The method of claim 118, wherein the suspension agent is an organic acid.
- 120 (New). The method of claim 118, wherein the suspension agent is a surfactant.
- 121 (New). The method of claim 118, wherein the suspension agent is ethyl carbonate.
- 122 (New). The method of claim 118, wherein the suspension agent is a material having a CAS number of CAS#1344-28-1.
- 123 (New). The method of claim 118, wherein the suspension agent comprises a hydrous sodium lithium magnesium silicate.
- 124 (New). The method of claim 118, wherein the suspension agent comprises ammonium polymethacrylate.
- 125 (New). The method of claim 118, wherein the suspension agent comprises colloidal silica.
- 126 (New). The method of claim 118, wherein the suspension agent comprises a surfactant.
- 127 (New). The method of claim 118, wherein the suspension agent comprises an organic acid.
- 128 (New). The method of claim 118, wherein the suspension agent comprises succinic acid.
- 129 (New). The method of claim 118, wherein the suspension agent comprises a second abrasive different from the first abrasive.
- 130 (New). The method of claim 112, wherein the feature comprises Ir.

131 (New). The method of claim 112, wherein the feature comprises IrO₂.

132 (New). The method of claim 112, wherein the feature comprises platinum.

133 (New). The method of claim 112, wherein the feature comprises gold.

134 (New). The method of claim 112, wherein the feature comprises silver.

135 (New). The method of claim 112, wherein the first abrasive consists essentially of *alpha*-alumina.

136 (New). The method of claim 112, wherein the first abrasive consists essentially of *gamma*-alumina.

137 (New). The method of claim 112, wherein the first abrasive consists essentially of *alpha*-alumina and *gamma*-alumina.

138 (New). The method of claim 122, wherein the substrate further comprises a dielectric material, and wherein the selectivity of the composition for polishing the noble metal-containing material over polishing the dielectric material is at least 1:1, and further comprising a second polishing process utilizing a second composition, wherein the selectivity of a second composition for polishing the noble metal-containing material over polishing the dielectric material is about 1:1.